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REVIEWS

Stratigraphy of the Pennsylvanian Series in Missouri. By HENRY HINDS and F. C. GREENE. Missouri Bureau of Geol. and Mines, Vol. XIII, 1915. Pp. 407, figs. 5, pls. 32, map 1.

This volume treats chiefly of the stratigraphy, paleontology, and lithology of the barren formations of the Pennsylvanian series in this state, thus supplementing Vol. XI, which deals primarily with the coal deposits.

The subdivisions now recognized in the series are given below:

Group	Formation
Missouri	Wabaunsee Shawnee Douglas Lansing Kansas City
Des Moines	Pleasanton (unconformity in) Henrietta Cherokee

The formations in this classification are differentiated into 30 members which might be called formations by those who give the Pennsylvanian the rank of a system. The system is markedly unconformable on the beds beneath, and its upper members are the youngest consolidated rocks in the state.

The Des Moines and Missouri groups were differentiated originally with the belief that the latter contained much greater quantities of limestone. The only basis now recognized is a rather well-marked faunal break. There are rather strong indications of a widespread unconformity in the Pleasanton, and this faunal break may be related to it. If this is found to be true the plane between the two groups will be drawn at the unconformity. There has been much confusion in the nomenclature of the Pennsylvanian of this area owing to duplication of names and miscorrelations. That considerable progress has been

made in correcting this situation is indicated by the fact that the classification of this report has been approved by the United States Geological Survey and is now official for the state surveys of Kansas, Iowa, and Nebraska with one minor exception in each of the last two states.

Lithologically, the series is made up chiefly of shales alternating with limestones. Sandstones, clay, and coal are found in lesser quantities. Most of the lithologic units are quite persistent laterally, but a few are notably lenticular. The broader features of the present structure have resulted from two periods of folding since the close of the Pennsylvanian. The first of these developed monoclinial dips to the west and northwest and the second formed a number of narrow anticlines with associated synclines. The axes of these folds are markedly parallel and trend northwest-southeast throughout the state. These are shown on a structure contour map drawn on the basis of rather meager data.

Invertebrate paleontology is the subject of an exhaustive chapter by Dr. Girty. More than 250 collections containing more than 350 species form the basis of his report. The species are listed by localities and by zones for each formation, and the valuable data of these lists is made available more readily by a composite table showing the range of each species. Descriptions and illustrations are given of a number of species that are new or have been called into question. Paleobotany is discussed in a short chapter by David White.

Some progress has been made in correlating the Missouri series with eastern areas. Paleontological evidence indicates that the lower part of the Cherokee is of Pottsville age and the upper part is basal Allegheny. It is suggested on the basis of incomplete collections that Allegheny time extends to the unconformity in the Pleasonton and that Conemaugh time ends well up in the Shawnee.

The writers of this valuable report did not fail to include a chapter of bibliography which includes all the important publications consulted in its preparation.

W. B. W.

The Red Iron Ores of East Tennessee. By ERNEST F. BURCHARD.
Bull. Tenn. Geol. Survey No. 16, 1913. Pp. 173, pls. 17
(including 5 maps), figs. 30 (including 6 maps).

The purpose of this report is to describe and explain the origin of the red iron ores as they occur in the Cumberland Plateau and the Great Valley in east Tennessee.